

WHAT IS CLAIMED IS:

1. An immunogenic composition, comprising:  
a naturally-chelating nonimmunogenic polymer;  
a metal ion; and  
an adjuvant,  
wherein said metal ion is bound to said naturally-chelating nonimmunogenic polymer.

2. The immunogenic composition of claim 1,  
wherein said naturally-chelating nonimmunogenic polymer  
is a polysaccharide.

3. The immunogenic composition of claim 2,  
wherein said polysaccharide is an alginate.

4. The immunogenic composition of claim 1,  
wherein said metal ion is selected from the group  
consisting of: ionic lead, mercury, cadmium, aluminum,  
lithium, strontium, copper, aluminum, iron, antimony,  
arsenic, bismuth, chromium, copper, molybdenum, nickel,  
thallium, technetium, gadolinium, barium, indium, and  
tin.

5. The immunogenic composition of claim 4,  
wherein said metal ion is a lead ion.

6. The immunogenic composition of claim 4,  
wherein said metal ion is a mercury ion.

7. The immunogenic composition of claim 1,  
wherein said adjuvant is selected from the group  
consisting of: complete Freund's adjuvant (CFA),

incomplete Freund's Adjuvant (IFA), montanide ISA (Incomplete Seppic Adjuvant), Ribi Adjuvant System (RAS); TiterMax; Syntex Adjuvant Formulation (SAF); aluminum salts; nitrocellulose-adsorbed antigen; immune-stimulating complexes (ISCOMs); and Gerbu adjuvant.

8. The immunogenic composition of claim 7, wherein said adjuvant is Complete Freund's adjuvant.

9. The immunogenic composition of claim 7, wherein said adjuvant is aqueous aluminum magnesium hydroxide gel.

10. The immunogenic composition of claim 1, wherein said naturally-chelating nonimmunogenic polymer is formed as a composition of beads.

11. The immunogenic composition of claim 10, wherein said beads have an average diameter of at least about 50  $\mu\text{m}$ .

12. The immunogenic composition of claim 11, wherein said beads have an average diameter of no more than about 250  $\mu\text{m}$ .

13. The immunogenic composition of claim 10, wherein said beads further comprise an agarose.

14. The immunogenic composition of claim 13, wherein said naturally-chelating nonimmunogenic polymer is an alginate.

15. The immunogenic composition of claim 14, wherein said agarose is crosslinked to said alginate.

16. The immunogenic composition of claim 15, wherein said crosslink is formed using divinylsulfone.

17. The immunogenic composition of claim 1, wherein said metal ion is bound saturably to said naturally-chelating nonimmunogenic polymer.

18. The immunogenic composition of claim 17, wherein said metal ion is present in excess of the number of saturable metal ion binding sites of said naturally-chelating nonimmunogenic polymer.

19. The immunogenic composition of claim 1, wherein said metal ion is chelated to said naturally-chelating nonimmunogenic polymer.

20. The immunogenic composition of claim 19, wherein said metal ion is chelated reversibly to said naturally-chelating nonimmunogenic polymer.

21. The immunogenic composition of claim 1, further comprising:

a nonpolysaccharide chelator,

wherein said nonpolysaccharide chelator is capable of chelating said metal ion.

22. The immunogenic composition of claim 21, wherein said nonpolysaccharide chelator is selected from the group consisting of: EDTA, DTPA, meso-2,3-dimercapto succinic acid (DMSA),

2,3-dimercapto-1-propane sulfonate (DMPS),  
dimercaptopropanol, metallothionein, lactate,  
penicillamine, deferoxamine, and triethylene tetramine  
dihydrochloride.

23. The immunogenic composition of claim<sup>✓</sup> 22,  
wherein said nonpolysaccharide chelator is EDTA.

24. The immunogenic composition of claim<sup>✓</sup> 21,  
wherein said chelator is present in an amount  
sufficient to bind all of said metal ion that is  
present in excess of metal ion binding sites of said  
naturally-chelating nonimmunogenic polymer.

25. The immunogenic composition of claim<sup>✓</sup> 21,  
further comprising:

a crosslinked protein,  
wherein said protein has been crosslinked in the  
presence of said naturally-chelating nonimmunogenic  
polymer and said nonpolysaccharide chelator.

26. The immunogenic composition of claim<sup>✓</sup> 25,  
wherein said protein is selected from the group  
consisting of: nonxenogeneic serum albumins and  
gelatins that are liquid at room temperature.

27. The immunogenic composition of claim<sup>✓</sup> 26,  
wherein said protein is a serum albumin.

28. The immunogenic composition of claim<sup>✓</sup> 27,  
wherein said serum albumin is rabbit serum albumin.

29. The immunogenic composition of claim 25, wherein said protein is crosslinked using a crosslinker selected from the group consisting of: formaldehyde, glutaraldehyde, and glyoxal.

30. The immunogenic composition of claim 29, wherein said crosslinker is glutaraldehyde.

31. The immunogenic composition of claim 26, wherein said protein is a gelatin that is liquid at room temperature.

32. The immunogenic composition of claim 31, wherein said gelatin is a cold-water fish gelatin.

33. The immunogenic composition of claim 25, wherein said protein is present in an amount sufficient, upon crosslinking, to create a gel at room temperature.

34. The immunogenic composition of claim 1, wherein said composition is particulate.

35. The immunogenic composition of claim 34, wherein said metal ion-bound naturally-chelating nonimmunogenic polymer is substantially dried before admixture with said adjuvant.

36. The immunogenic composition of claim 35, wherein said metal ion-bound naturally-chelating nonimmunogenic polymer is lyophilized before admixture with said adjuvant.

37. An immunogenic composition, comprising:  
a particulate naturally-chelating  
nonimmunogenic polymer complexed with a metal ion, and  
an adjuvant.

38. The immunogenic composition of claim 37,  
wherein said particulate, metal ion-complexed,  
naturally-chelating nonimmunogenic polymer is  
depotized.

39. The immunogenic composition of claim 38,  
wherein the metal ion of said depotized particulate  
metal ion-complexed naturally-chelating nonimmunogenic  
polymer is dynamically bound by a plurality of  
chelators.

40. An immunogenic composition, comprising:  
an immunogen; and  
a crosslinked gelatin soluble at room  
temperature,  
wherein said gelatin is crosslinked in the  
presence of said immunogen.

41. The immunogenic composition of claim 40,  
wherein said gelatin is a cold-water fish gelatin.

42. The immunogenic composition of claim 40,  
further comprising an adjuvant.

43. A method of making an antibody reagent,  
the method comprising:

immunizing a nonhuman animal with the immunogenic composition of any one of claims 1, 37 or 40; and then

isolating an antibody that binds to said immunogenic composition.

44. The method of claim 43, wherein said isolating comprises the step of:

isolating said antibody from the serum of said nonhuman animal.

45. The method of claim 43, wherein said isolating comprises the initial step of:

isolating a cell that secretes an antibody that binds to said immunogenic composition.

46. The method of claim 45, wherein said cell is a clonal cell line.

47. The method of claim 44, further comprising:

affinity purifying said antibody reagent.

48. The method of claim 45, further comprising:

affinity purifying said antibody reagent.

49. An antibody reagent, comprising:

at least one isolated antibody,

wherein said antibody is specific for a metal ion as complexed to a naturally-chelating nonimmunogenic polymer.

50. The antibody reagent of claim 49,  
wherein said naturally-chelating nonimmunogenic polymer  
is an alginate.

51. The antibody reagent of claim 50,  
wherein said metal ion is selected from the group  
consisting of: ionic lead, mercury, cadmium, aluminum,  
lithium, strontium, copper, aluminum, iron, antimony,  
arsenic, bismuth, chromium, copper, molybdenum, nickel,  
thallium, technetium, gadolinium, barium, indium, and  
tin.

52. The antibody reagent of claim 51,  
wherein said metal ion is a lead ion.

53. The antibody reagent of claim 51,  
wherein said metal ion is a mercury ion.

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